

DWR Interim Levee Design Criteria V. 4 - Comment Log

No.	Section in ILDC Version 4	Comment	Author Name/ Organization (For public comments on Version 4)	Date	Response
1	-	Suggested using the term, "structural superiority" in future updates, after touring the New Orleans system which uses it to describe differential levee heights.	Dave Peterson , ILDC Member	1/6/11	Rather than introducing the term "structural superiority," the criteria for levee crown elevation have been separated from the design water surface elevation criteria and included in a new subsection entitled "Minimum Top of Levee."
2	2.0 (Definitions)	The definition of Assurance is not consistent with Corps terminology. An accurate definition is: "Assurance is a non-technical term used to indicate the need to account for uncertainty in the estimate of the hydrologic event. It describes the factor of safety needed to assure a project can contain the actual 200-year flood event with a prescribed confidence. This factor of safety is the computed Conditional Non-exceedance Probability (CNP) of the estimate. An example would be the 90% CNP for the 200-year flood flow would provide a 90% Assurance of containing the true 200-year flood flow. In this document Assurance means the CNP of the estimate."	Joe Countryman, MBK Engineers	12/10/10	The definition of assurance has been modified and expanded.
3	5.2 (Geotechnical Design Principles)	Asked whether they intend to actually define areas to overtop and make them robust as far as erosion. Ed noted that in his experience, there has usually been a concrete sill provided for the water to go over.	Ed Ketchum, US Army Corps of Engineers	1/6/11	Text that provided criteria for levee overtopping design has been removed and the situation where a levee is lower than required is now to be addressed as an exception to the criteria, with appropriate consideration for the flooding that could occur on the landside of the levee as well as the risk of a levee breach.
4	5.2 (Geotechnical Design Principles)	There needs to be a plan with what to do with the water that is flowing in over the levees, possibly some type of drainage area.	Les Harder, ILDC Member	1/6/11	Text that provided criteria for levee overtopping design has been removed and the situation where a levee is lower than required is now to be addressed as an exception to the criteria, with appropriate consideration for the flooding that could occur on the landside of the levee as well as the risk of a levee breach.
5	6.1 (Design Water Surface Elevation Criteria)	The admonition for increasing the DWSE because of possible future changes in hydrology is unjustified. The Freeboard (deterministic analysis) and the 90% Assurance (risk analysis) already account for potential changes in the best estimate (median) hydrology. Another increase is not justified.	Joe Countryman, MBK Engineers	12/10/10	The text has been revised to recommend consideration of increasing DWSE to account for climate change, etc. based on judged potential for underestimating the median 200-year WSE and "to the extent that the hydrology being utilized does not explicitly take into consideration climate change."
6	6.1 (Design Water Surface Elevation Criteria)	Roughness Coefficients: It is reasonable to assume -- and recent experience on Feather River Early Implementation Projects bears this out -- that land use and associated vegetation cover can and, in many instances, will change over time. Therefore, roughness coefficients for floodplains will vary over the life of a leveed floodway project and there is little certainty in maintaining the existing land use base conditions modeled to establish Design Water Surface Elevation (DWSE). Neither the Corps' risk and uncertainty approach nor FEMA deterministic design approach used in establishing DWSE necessarily address potential changes in land use. In most instances, it would be prudent to use a Manning's n value consistent with very dense riparian understory and forest. Incorporating a realistic maximum degree of roughness into DWSE criteria would allow for changes in land use with less conflict and with no significant hydraulic encroachment on an established DWSE, due to changes in vegetation cover type. Interim levee design criteria that incorporate the use of maximum roughness values would allow for increases in riparian habitat where capacity and space allow; reduced maintenance costs; and, if necessary, provide capacity for adaptive management in the future.	Stacy Cepello, DWR	2/4/11	Roughness coefficients assumptions are site-specific and not described in the ULDC. The text has been revised to advise use of channel roughness values consistent with vegetation that is anticipated or likely to grow over the next 20 years.

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7	6.1 (Design Water Surface Elevation Criteria)	Climate Change: Due to the continuing altering baseline conditions including the form, timing, quality, and amount of precipitation and runoff, Milly et al. have concluded that "stationarity is dead" and, therefore, should no longer serve as a central, default assumption in water resource risk assessment and planning. Other methods such as sensitivity analysis and statistical techniques that characterize extreme behavior changes are still dependent on limited historical time series data. This creates a dilemma where the wide-ranging and pervasive negative consequences of climate change are largely unpredictable, but we are still compelled to make large irreversible investments in levee construction before we even know how to assess the magnitude of these potential changes. ¶ The primary way to address the uncertainty of climate change is adaptation (moderate harm or exploit beneficial opportunities). But, the simple fact is that one cannot easily or inexpensively manage or adapt multi-million dollar levees. Recognizing the limitations of our adaptive capacity, DWR has adopted a policy of "no regrets" in regards to funding Early Implementation Projects. In this context no regrets means <i>projects that are likely to be consistent with an adopted CVFPP</i> . Yet, the urban level of protection adopted by the CVFPP will likely rely on the 200-year levee design criteria included in this or some future version of the ILDC. This circular approach to addressing climate change in the near-term is maladaptive at best. ¶ Before we make a substantial, irreversible, commitment of resources to construct projects that potentially limit our options in an uncertain future, we should take a more conservative "no regrets" approach to project design. The most effective way to do this is to preserve as much open space (width between levees, rather than added height) as is physically, economically, and politically possible. Levee setbacks would increase the flood system's resilience and adaptive capacity, allowing for the staging of future improvements to the flood system with the least amount of impact. In the face of hydrologic uncertainty and the increasing value placed on the environmental benefits and recreational opportunities provided by unprotected floodplains, levee design criteria for urban and urbanizing areas should stress maximum feasible floodway width over more traditional benefit-cost analysis and optimization techniques to determine levee height vs. setback.	Stacy Cepello, DWR	2/4/11	The text has been revised to recommend consideration of increasing DWSE to account for climate change, etc. based on judged potential for underestimating the median 200-year WSE and "to the extent that the hydrology being utilized does not explicitly take into consideration climate change." Other methods to attain urban level of protection (structural and nonstructural measures other than levee and floodwall design) are covered in the Urban Level of Flood Protection Criteria, rather than the ULDC.
8	6.4 (Frequently Loaded Levees criteria)	A figure would be helpful to clarify the definition of a "frequently loaded levee" and avoid confusion. Based on the definitions in Section 2.0, "levee toe" is defined as the landside levee toe. Therefore, as we read the ILDC V4, the water surface elevation for a frequently loaded levee should be one-foot above the elevation of the landside toe at least once per day for more than 36 days per year. Assuming this is the correct interpretation, a figure would aid in preventing possible confusion between the landside and the waterside toe. Also, as discussed during the public workshop, maps providing guidance as to which levees have been classified as "frequently loaded" would have been a helpful addition to v5.	Darren Mack, SAGE Inc	2/4/11	The definition of frequently-loaded levee was revised to specify the landside levee toe. Figure 3-1 was added to the Definitions Section to illustrate the landside levee toe. Because data is limited and the document is now being expanded to cover the entire State, it was decided to leave classification of frequently-loaded levees up to the local agencies making the finding of urban level of protection, rather than to develop maps.
9	6.7 (Erosion Criteria)	A discussion of the potentially very poor performance of embankments constructed of dispersive clays should be added to report, wither to this section of as a stand-alone section. Dispersive clays are highly susceptible to both surface erosion and internal erosion, such as piping. The U.S. Bureau of Reclamation has commissioned several studies of dispersive clays following failures of several small earthen dams caused by piping through the dispersive clay embankment material. It is our experience that dispersive clays are present in California, particularly as you traverse west through the Delta. Currently, both the Sacramento District SOP and EM 1110-2-1913 are silent on testing for dispersive clays. However, we believe it appropriate that, at a minimum, screening for dispersive clays be performed for all proposed levee embankment borrow sources.	Darren Mack, SAGE Inc	2/4/11	Text has been added to Section 7.10 Erosion to list "erodible materials, particularly low cohesion sands/silts or dispersive soils" as a factor in considering erosion potential.
10	6.7 (Erosion Criteria)	Felt that the section was not yet ready to be considered "fixed" criteria and instead should be considered "under construction".	Ray Costa, ILDC Member	1/6/11	Since the Erosion Section (and other sections previously "under development") have been developed further, the ULDC includes all topics as criteria (except for procedural criteria).
11	6.7 (Erosion Criteria)	It was suggested that the standard allow for a 2:1 waterside slope.	Commenter unknown	1/6/11	The standard was retained as 3h:1v waterside slope, with some exceptions allowed.
12	6.8 (Right of Way)	Consider speculation that the USACE is requiring numbers as high as 40 feet.	Darren Mack, SAGE Inc	1/6/11	The ULDC retained 20 feet, except in developed areas where this is not practical. This is consistent (and less stringent in developed areas) with proposed revisions to Title 23. USACE practice in the Sacramento District has not required 40 feet.
13	6.8 (Right of Way Criteria)	The Right of Way section addresses objectives but also describes criteria. He suggested there should be more clarification.	Mike Nolan, City of Sacramento	1/6/11	The right-of-way section has been reorganized and further developed to identify criteria.

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14	7.1 (Encroachment Criteria)	Noted that in urban areas there are a lot of encroachments and penetrations that are not visible and are not limited to pipes and that research into the history of the levee and nearby activities can be important.	Kim Tremaine, Tremaine and Associates	1/6/11	Agreed that unknown penetrations are important. A Section 7.13.3 was added for investigation for Unknown Penetrations.
15	7.1 (Encroachment Criteria)	Clarify whether or not encroachments would cover utility poles, noting that thousands of poles exist in these areas.(1-6-11) There is no reference to existing transmission or distribution, electrical or pipeline systems. The federal statute relating to construction of utility structures (33CFR 208.10) and respective state statute (23CCR 123 (b) (2)) both allude to the coexistence of utility structures within or proximal to levees. Geotechnical mitigation measures have been identified and demonstrated to ensure that no adverse effects to levees result from such construction. The mutual coexistence of utility structures and levees in a programmatic manner can be best accomplished in a collaborative forum between interested parties that will further the goals of both the CVFMPP and PG&E. (2-4-11)	Lonn Maier, PG&E	1/6/2011 & 2/4/2011	Encroachments section covers utility poles. The criteria in Section 7.12 (Encroachments) focus on identifying high hazard encroachments, so if utility poles are not identified as such they would not require a full engineering evaluation.
16	7.2 (Penetrations)	I have reviewed a significant amount of contemporary and historic literature on penetrations to shed light on this very murky topic. I offer the following suggestions in an effort to further the development of design criteria for these features, with the aim of making our levees safer. Please consider these suggestions as a work in progress, requiring input from experts in geotechnical engineering. I herein propose the following: (1) a formal definition of a levee/foundation penetration; (2) a classification scheme based on the origin of a penetration; and (3) a list of descriptive parameters relevant to hazard assessments relative to penetrations.	Kim Tremaine, Tremaine and Associates	7/5/10	The definition for penetration was modified. A hazard assessment is required for penetrations to identify those that are high hazard and a description of the hazard assessment is provided (Section 7.13). The engineer must also consider performing an investigation for unknown penetrations.
17	7.2 (Penetrations)	As a next step, I suggest a score of general confidence be incorporated into the overall assessment related to how well a levee reach has been characterized with regard to both known and undocumented penetrations. In addition to the general confidence score, conditions ratings/hazards rankings of individual penetrations should be made in an effort to more realistically portray the overall factor of safety assigned to a levee system. This will allow better decision-making regarding prioritization of remediation efforts, thereby reducing flood risk and liability, while increasing public safety.	Kim Tremaine, Tremaine and Associates	7/5/10	A hazard assessment is required for encroachments and penetrations to identify those that are high hazard and a description of the hazard assessment is provided.
18	7.4 (Vegetation Criteria)	It was suggested that more guidance regarding the waterside planting berm be provided.	John Baker, Kleinfelder	1/6/11	Language regarding a waterside planting berm has been retained in the vegetation criteria in Section 7.16. Considering the wide varieties of possible vegetative plantings and levee geometries, soil conditions, and loading conditions, engineering properties and dimensions have not been proposed, leaving this to the engineer's judgment.
19	7.4 (Vegetation Criteria)	It is important to distinguish between new levees and legacy levees when determining what is considered allowable vegetation. Les noted that often fruit and nut-bearing trees are not allowed but some research shows that trees reduce rodent burrowing.	Les Harder , ILDC Member	1/6/11	The vegetation criteria now differentiate between new levees and levee repair or improvement, and levees with preexisting vegetation (legacy levees) in Section 7.16.
20	7.4 (Vegetation Criteria)- Bullet 2	We believe more information needs to be included on what constitutes "an engineering inspections and evaluation" and what criteria would be used to "identify trees and vegetation that pose a clear and unacceptable threat to the integrity of the levee." In addition, a process should be drafted which included a peer review of the engineering evaluation so that no one entity is making decisions regarding the fate of the levee vegetation.	Susan Moore, USFWS	2/2/11	New text was added in Section 7.16 to clarify what constitutes routine inspection and engineering evaluation. But it will come down to the judgment of the engineer and levee maintaining agency as to what constitutes an unacceptable threat to levee integrity. The state of science at this point in time is not adequate for establishing definitive criteria in this document. That may change in the future based on results of ongoing and future research.
21	7.4 (Vegetation Criteria)- Bullet 3	It is not clear what an arborist would be looking for in occasional observation, and of equal importance who would be responsible for funding this activity should be identified. Inspection criteria and a funding plan should also be drafted.	Susan Moore, USFWS	2/2/11	New text was added for routine inspection criteria in Section 7.16, but funding plans are not addressed in this document.
22	7.4 (Vegetation Criteria)- Bullet 4	The first sentence should be modified to read: existing trees shall be trimmed/thinned and immature tress shall be removed, subject to compliance with State and federal environmental laws, from all of the following areas....This was included in the February 27, 2009, California's Central Valley Flood System Improvement Framework document (see page 7-5 of the Version 4 document). Furthermore, the Framework document states "vegetation removal will require mitigation..." which is not mentioned in the Version 4 Interim Levee Design Criteria document."	Susan Moore, USFWS	2/2/11	The text was edited to say, "Levees with existing vegetation are to be maintained according to the levee vegetation management criteria included in the CVFPP. Additional detail about the criteria are provided below this statement in Section 7.16. Text has been added to note that this document sets criteria for determining 200-year protection and does not discuss mitigation requirements for the actions that may be involved in achieving 200-year protection, and that removal of immature trees is to be conducted in consultation with appropriate resources agencies.

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23	7.4 (Vegetation Criteria)- Bullet 5	Again compliance with State and federal environmental laws should be referenced.	Susan Moore, USFWS	2/2/11	Text has been added to note that this document sets criteria for determining 200-year protection and does not discuss mitigation requirements for the actions that may be involved in achieving or maintaining 200-year flood protection.
24	7.4 (Vegetation Criteria)- Bullet 9	We are in agreement with the concept outlined above provided it is made clear to levee owners that during the period woody vegetation is allowed to live out its life on the levee crown, landside slope and levee easement area, other similar habitat, either within the floodway or immediately adjacent the landside levee toe (outside the levee easement area), is developed concurrently. Otherwise, the net effect is complete elimination of woody vegetation on these area of the levee, which would have detrimental effects to wildlife species, especially during flood events, foraging and shelter area throughout the year and important nesting habitat for migratory birds. A critical component of any life cycle plan for vegetation will be identifying a site protection mechanism (conservation easement) and long-term funding for operation and maintenance in perpetuity for alternative vegetation areas, and a maintaining entity.	Susan Moore, USFWS	2/2/11	New text has been developed to differentiate legacy levees from new levees, including life cycle management. Also, text has been added to note that this document sets criteria for determining 200-year protection and does not discuss mitigation requirements for the actions that may be involved in achieving or maintaining 200-year protection.
25	7.4 (Vegetation Criteria)- Bullet 10	We suggest the term "critical habitat" not be used as it has a regulatory definition under the Federal Endangered Species Act of 1973, as amended, and could cause confusion. Important habitat may be a better phrase to use.	Susan Moore, USFWS	2/2/11	Text revised to state, "important or critical habitat in consultation with the appropriate resources agencies" in Section 7.16.4.
26	7.6 (Security Criteria)	Security regulations are restricting the public's access to information regarding flood plain safety.	Commenter Unknown	1/6/11	Comment acknowledged. Some information may not be appropriate for public release and this topic is covered at the end of Section 7.18.
27	7.6 (Security Criteria)	If you write the criteria into the ca code of regs that's a perfect place to mandate terrorism awareness products similar (or actually a part of) the national "if you see something say something" campaign.	Brian Banning, ILDC Member	1/6/11	DWR's intent is for the ULDC to later be codified into regulations, and security criteria would be part of the regulations.
28	7.13 (Expert Panel Review)	Was concerned about the requirement of a panel's majority vote on geotechnical criteria, since there could not be a majority if there are only two geotechnical panelists and they disagree.	Joe Countryman, MBK Engineers	1/6/11	This is a topic covered in Draft Procedures, which is now a draft attachment to the ULDC because it is being developed in a separate process for the Urban Level of Flood Protection Criteria. The current draft procedure for exceptions no longer requires a majority. It simply requires concurrence from the panel in the peer review report.